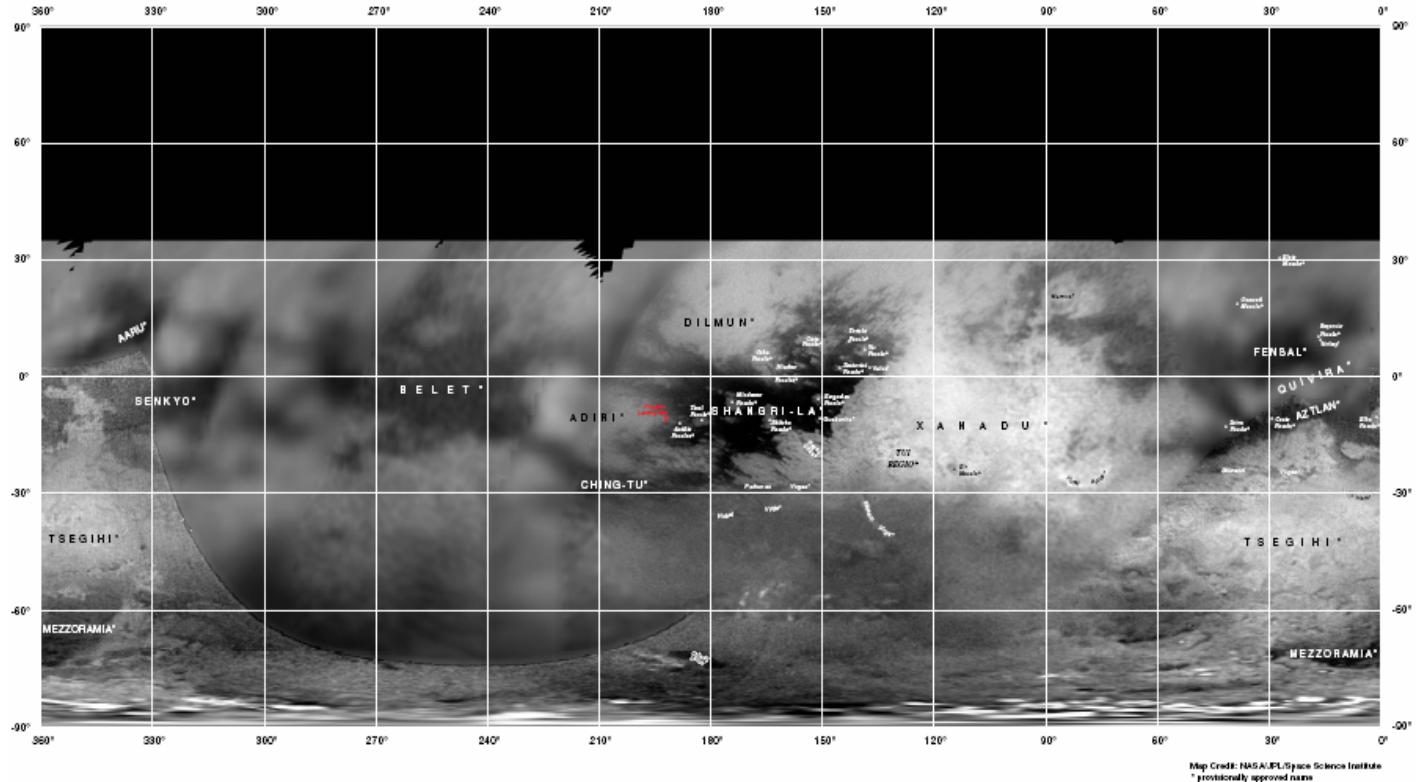


CASSINI



TITAN 022TI (T12) MISSION DESCRIPTION

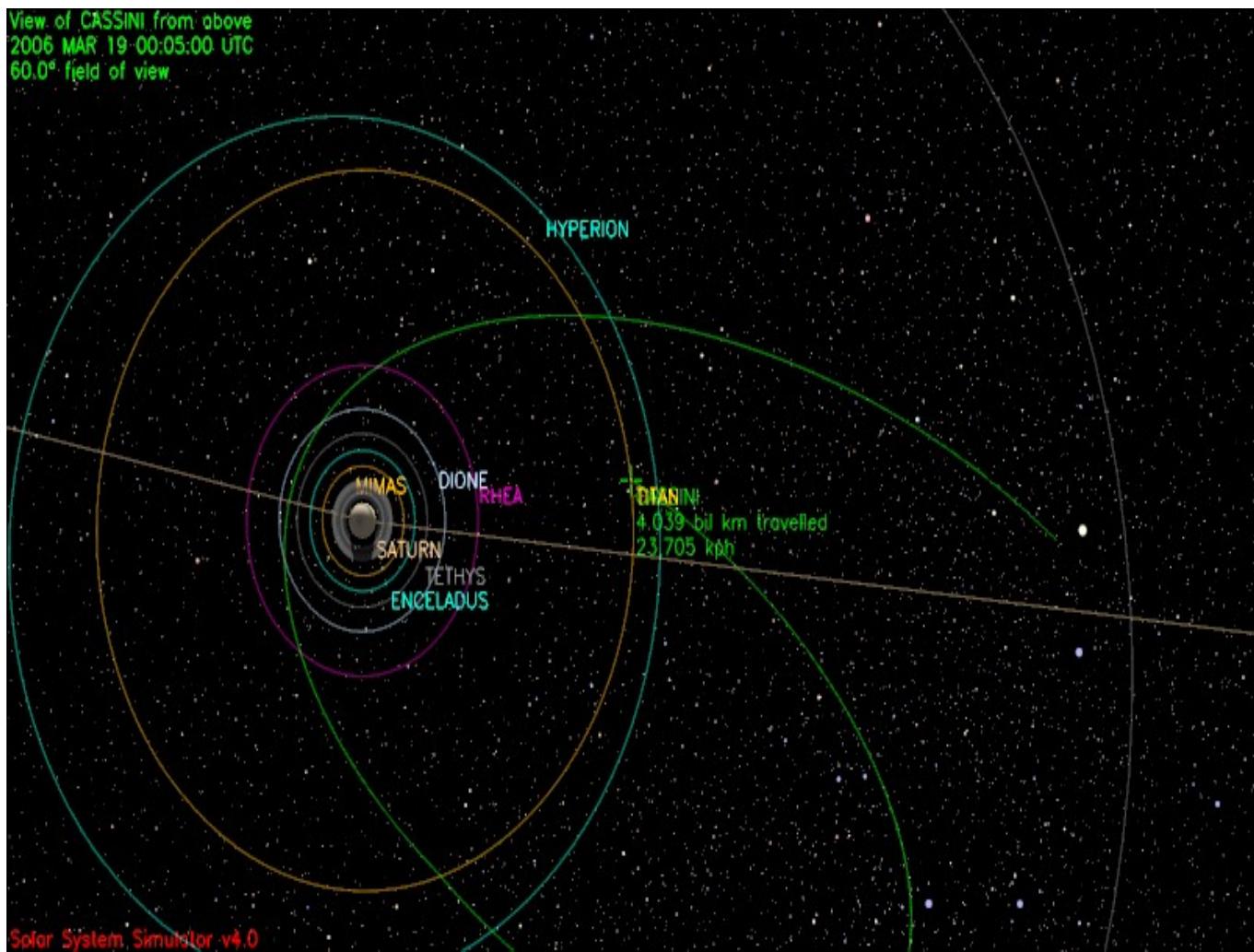
March 2006

Jet Propulsion Laboratory
California Institute of Technology

1.0 OVERVIEW

Only 19 days after Titan-11, Cassini returns to Titan for its thirteenth targeted encounter. The closest approach to Titan occurs on Sunday, March 19, at 00:06 spacecraft time (Saturday March 18 at 06:16 PM Pacific Time) at an altitude of 1951 km (1219 miles) above the surface and at a speed of 5.8 kilometers per second (12,977 mph). The latitude at closest approach is 0° (equator) and the encounter occurs on orbit number 22.

This encounter is set up with two maneuvers: an apoapsis maneuver that was scheduled for March 5, and an approach maneuver, scheduled for March 15. However, the apoapsis maneuver was so small that it was cancelled. This inbound encounter occurs about 2 days prior to Saturn closest approach.



1.1 ABOUT TITAN

Titan is one of the primary scientific interests of the Cassini-Huygens mission. Through observations by Earth-based telescopes and the Voyager spacecraft, Titan has been revealed to be an intriguing world both similar in nature to Earth and unique among both satellites and terrestrial planets. The largest of Saturn's satellites, Titan is larger than the planets Mercury or Pluto. Titan is the only satellite in the solar system with an appreciable atmosphere. Like Earth's atmosphere, Titan's atmosphere is composed mostly of Nitrogen, with several percent methane and trace quantities of other hydrocarbons. Significant quantities of aerosols and organic compounds (hydrocarbons) mask Titan's surface, similar to smog on Earth. Although Titan's thick smoggy atmosphere masks its surface, scientists have hypothesized that Titan's surface could contain solid, liquid and muddy material creating features such as lakes, seas, or rivers. Additionally liquid reservoirs may exist beneath the surface forming geysers or volcanoes that feed flowing liquid onto the surface. The desire to see Titan's surface and investigate these tantalizing possibilities affected the capabilities required for Cassini's payload of scientific instruments.

Titan's peak surface temperature is about 95 Kelvin, too cold for liquid water, and due to its thick atmosphere, the pressure at the surface is 1.6 times greater than Earth's atmosphere. At this temperature and pressure, chemicals such as methane, ethane, propane, ammonia, water-ice and acetylene may be involved in complex interior-surface-atmosphere chemical cycles resulting in eruptions, condensation and precipitation (or rain). Initial observations obtained by Cassini during the first several passes of Titan provided our first close up views of Titan in wavelengths ranging from visible light to infrared to radar. The Huygens probe successfully returned atmospheric data and images of the surface, providing ground truth for the Cassini Orbiter measurements. The results show a mysterious world even more complex than previously thought. The diversity of surface composition and its connection to Titan's geologic features remains a fundamental question. Huygens' results indicate that methane exists as a liquid just below the surface and may rain from the atmosphere periodically. Clouds in Titan's atmosphere were observed in the southern hemisphere, yet no clear explanation has emerged on what the clouds are composed of, or why more clouds do not exist. Observations of Titan's interaction with Saturn's magnetosphere indicate the presence of complex processes complicated by Titan's occasional emergence out of Saturn's magnetosphere into the solar wind.

1.2 TITAN-12 SCIENCE ACTIVITIES

- **Radio Science Subsystem (RSS)** - T12 provides the first Cassini tour opportunity for Radio Science (RSS) to observe Titan's ionosphere and neutral atmosphere using radio occultation, and Titan's surface using bistatic scattering. The radio occultation is the second ever of Titan, the first being a sole Voyager occultation in 1980. The three Cassini radio signals (Ka/X/S) are planned to probe the ionosphere and atmosphere of Titan on both the ingress and egress sides. The measurements provide important high-spatial-

resolution information about the large-scale structure of the ionosphere and atmosphere of Titan. The strength and polarization properties of the reflected signals, if detectable, provide important information about the dielectric constant of the surface region probed (physical nature) as well as the surface roughness.

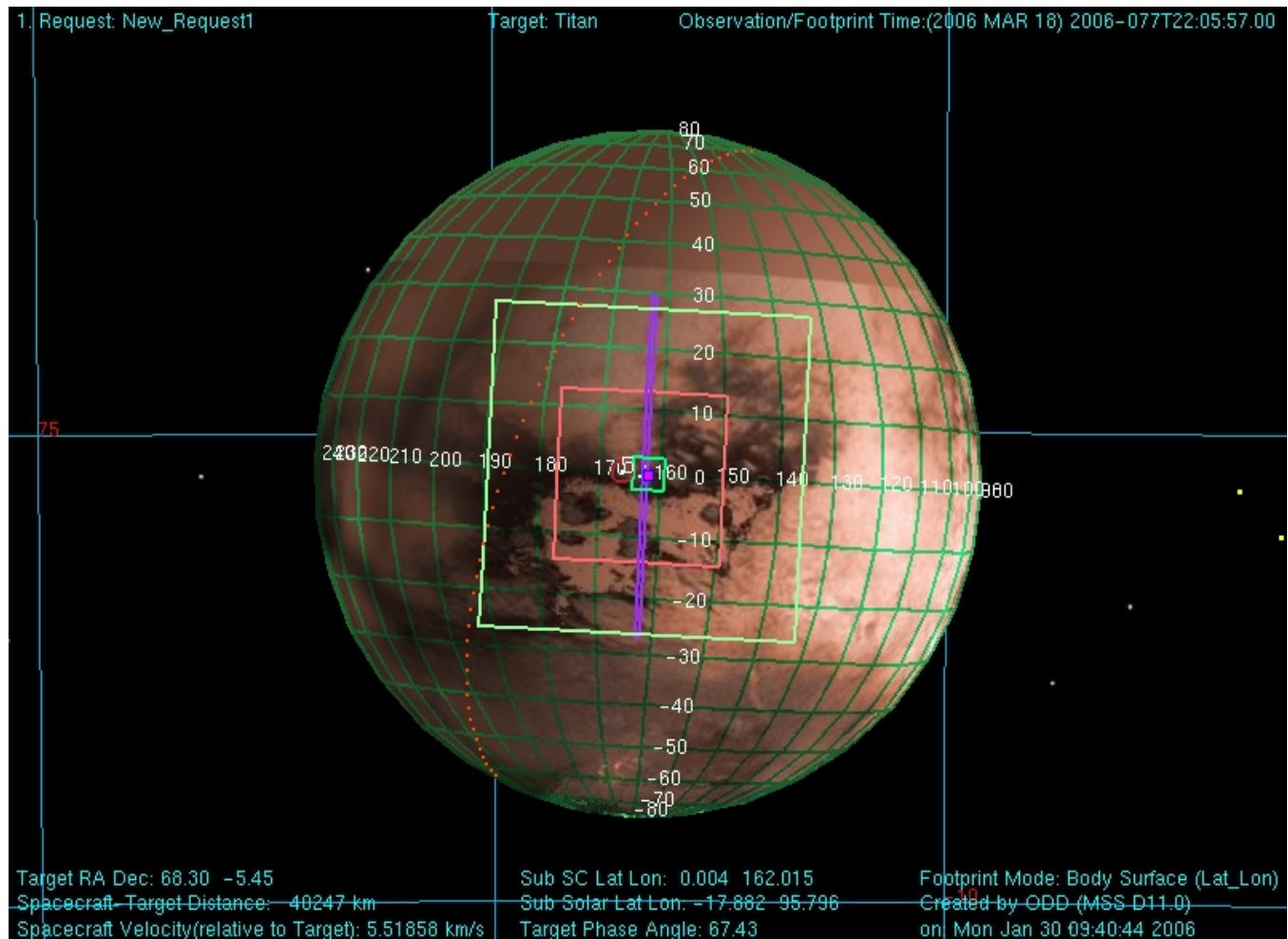
- **Imaging Science Subsystem (ISS)** - 32-frame global-scale mosaic extending over Shangri-La, Tui Regio, and western Xanadu, including a frame over Ontario Lacus to look for possible cloud activity and potential stereo with T44.
- **Visible and Infrared Mapping Spectrometer (VIMS)** - Search for and characterize mid-latitude clouds, aurorae, hotspots, and changes in surface properties. VIMS will also characterize the geologic features, haze and composition of Titan's equatorial region.
- **Composite Infrared Spectrometer (CIRS)** - Continue its global mapping of trace species (CO, H₂O, HCN) via rotational lines in the far-infrared by conducting inbound and outbound composition integrations.
- **RADAR** - Will add to their radiometry and scatterometry coverage of Titan.
- **Radio and Plasma Wave Spectrometer (RPWS)** - Observations in the immediate vicinity of Titan, including thermal plasma density and temperature measurements with the Langmuir probe, search for lightning and other radio emissions, characterization of plasma wave spectrum, and search for evidence of pickup ions.
- **Cassini Plasma Spectrometer (CAPS)** - Observations of Titan's interaction with Saturn's magnetosphere.
- **Ion and Neutral Mass Spectrometer (INMS)** - Determine atmospheric and ionospheric composition and thermal structure.

1.3 SAMPLE SNAPSHOTS

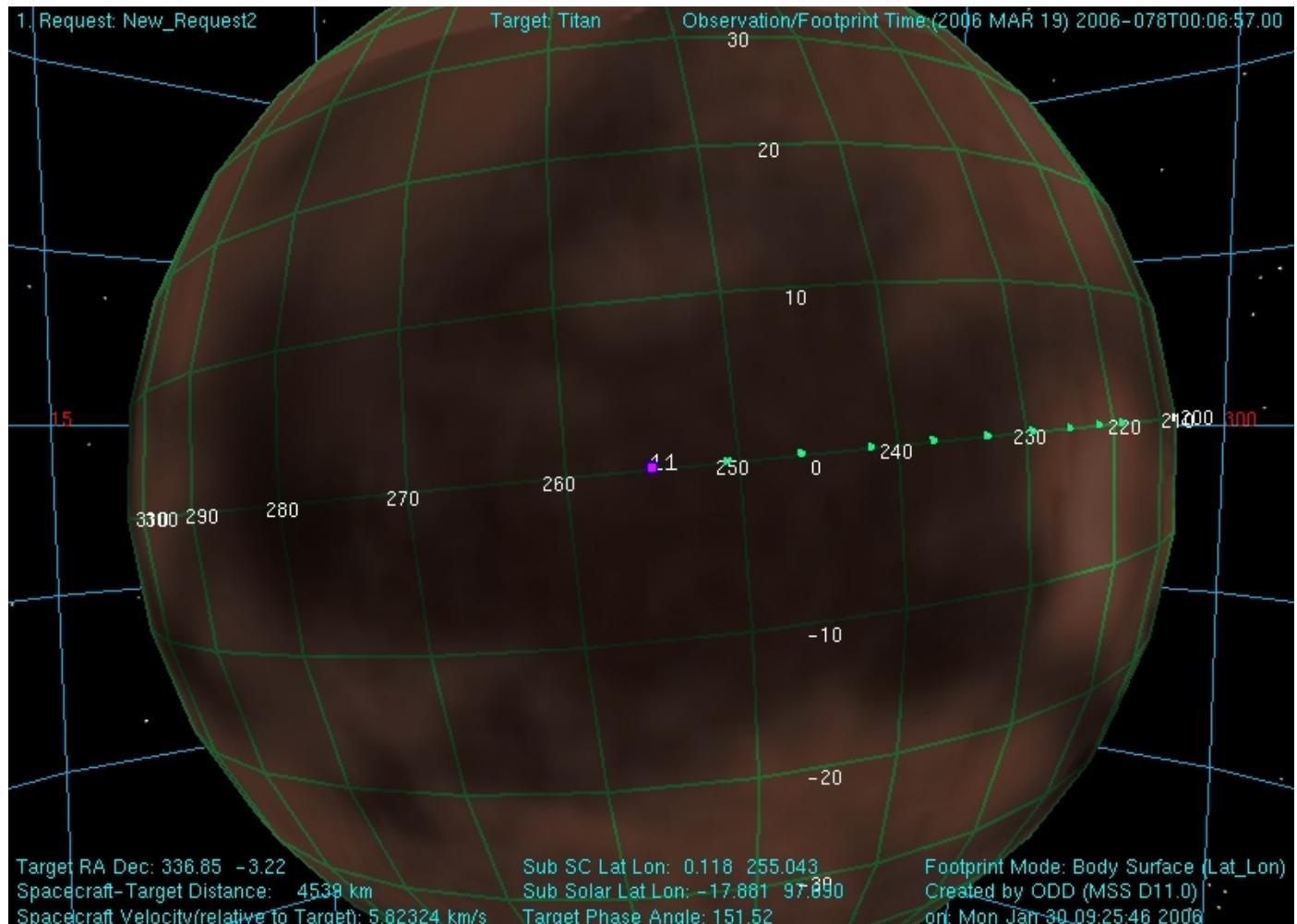
Three views of Titan from Cassini before, during, and after closest approach to Titan are shown below. The views are oriented such that the direction towards the top of the page is aligned with the Titan North Pole. Sample remote sensing instrument fields of view are drawn assuming that Cassini is pointed towards the center of Titan. The sizes of these fields of view vary as a function of the distance between Cassini and Titan. A key for use in identifying these instruments fields of view in the figures is listed below.

Key to Instrument Fields of View in Figures

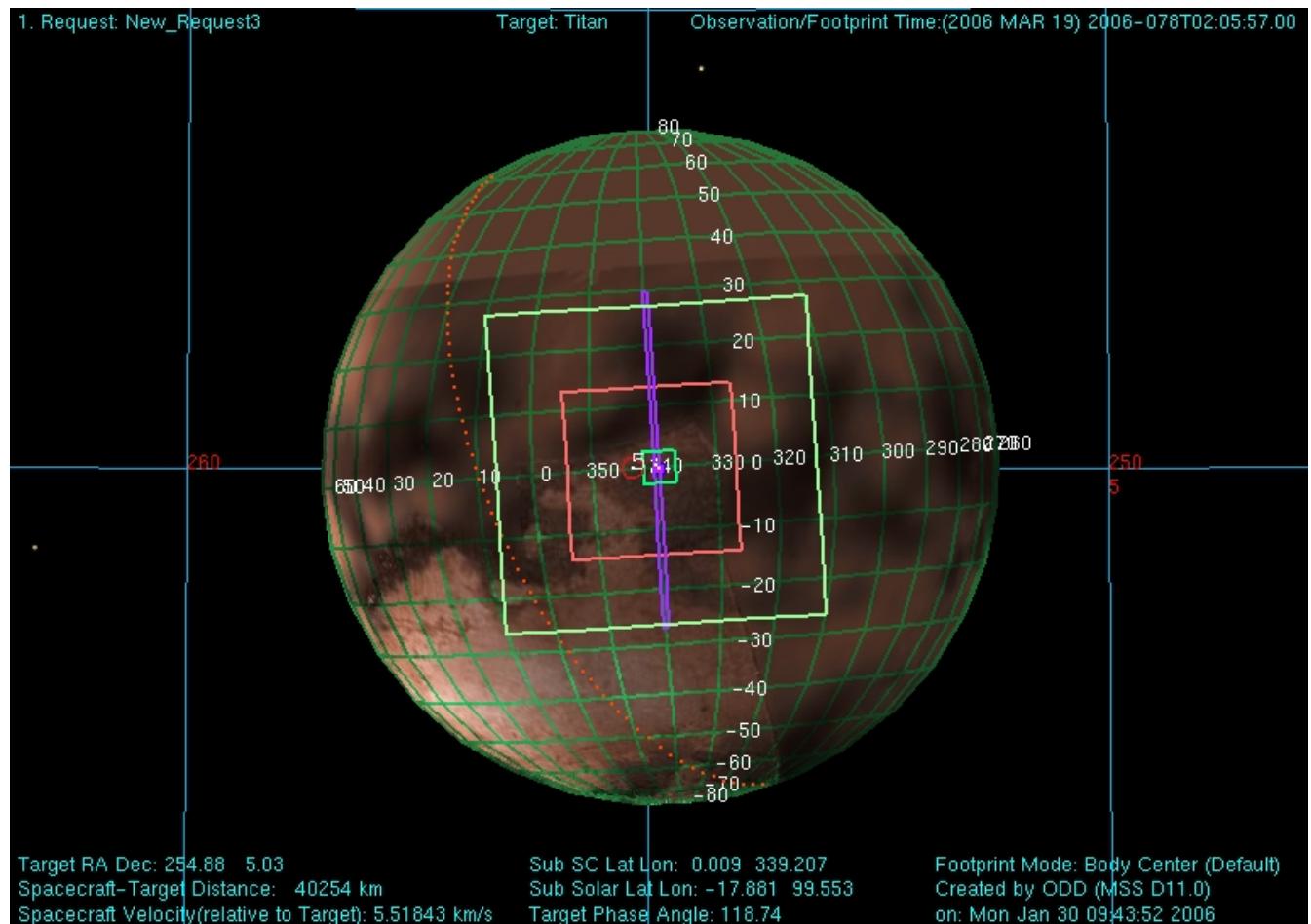
Instrument Field of View	Depiction in Figure
ISS WAC (imaging wide angle camera)	Largest square
VIMS (visual and infrared mapping spectrometer)	Next largest pink square
ISS NAC (imaging narrow angle camera)	Smallest green square
CIRS (composite infrared spectrometer) – Focal Plane 1	Small red circle near ISS_NAC FOV
UVIS (ultraviolet imaging spectrometer)	Vertical purple rectangle centered within largest square



View of Titan from Cassini 2 hours before Titan-12 closest approach



View of Titan from Cassini at Titan-12 closest approach



View of Titan from Cassini 2 hours after Titan-12 closest approach

Event Name: T12_22TI, Targeted Titan, Inbound. 050505 SPK: Table Creation Date (YYMMDD) 050712

Event Name at Event Time Only	SCET Date (YYYY-DOYTHH:MM:SS.FF) UTC	SCET Date (MM/DD/YYYY HH:MM:SS) UTC	SCET Date (MM/DD/YY YY HH:MM:SS) ET	Hours wrt Event Epoch	Minutes wrt Event Epoch	S/C Range (km)	S/C Altitude wrt Tri-axial Ellipsoid (km)	S/C North Latitude (deg)	S/C West Longitude SMEQP M Date (deg)	S/C Inertial Velocity (km/s)	S/C Radial Inertial Velocity (km/s)	S/C Tangential Inertial Velocity (km/s)	Central Body Angular Diameter (mrad)	Phase = Sun-Central Body-S/C Angle (deg)	Sun-S/C Central Body Angle (deg)	S/C Local True Solar Time wrt Central Body (hh:mm)	Sub-solar Latitude wrt Central Body (deg)	Sub-solar West Longitude wrt Central Body SMEQPM Date (deg)
	2006-077T00:05:56.80	18-Mar-06	00:07:01	-24	-1440	485,994.4	483,419.4	0.0	136.5	5.828	-5.823	0.226	10.6	62.9	117.1	07.54	-17.9	75.1
	2006-077T04:05:56.80	18-Mar-06	04:07:01	-20	-1200	402,715.1	400,140.1	0.0	140.0	5.745	-5.744	0.132	12.8	62.6	117.4	07.55	-17.9	78.9
	2006-077T06:05:56.80	18-Mar-06	06:07:01	-18	-1080	361,501.8	358,926.8	0.0	141.7	5.705	-5.705	0.089	14.2	62.5	117.5	07.56	-17.9	80.8
	2006-077T08:05:56.80	18-Mar-06	08:07:01	-16	-960	320,563.2	317,988.2	0.0	143.5	5.667	-5.667	0.046	16.1	62.4	117.6	07.56	-17.9	82.6
	2006-077T10:05:56.80	18-Mar-06	10:07:01	-14	-840	279,888.5	277,313.5	0.0	145.4	5.632	-5.632	0.005	18.4	62.4	117.6	07.56	-17.9	84.5
	2006-077T12:05:56.80	18-Mar-06	12:07:01	-12	-720	239,463.1	236,888.1	0.0	147.3	5.598	-5.598	0.037	21.5	62.4	117.6	07.56	-17.9	86.4
	2006-077T14:05:56.80	18-Mar-06	14:07:01	-10	-600	199,268.1	196,693.1	0.0	149.3	5.568	-5.568	0.082	25.8	62.5	117.5	07.55	-17.9	88.3
	2006-077T16:05:56.80	18-Mar-06	16:07:01	-8	-480	159,279.5	156,704.5	0.0	151.4	5.543	-5.541	0.134	32.3	62.8	117.2	07.54	-17.9	90.2
	2006-077T18:05:56.80	18-Mar-06	18:07:01	-6	-360	119,468.0	116,893.0	0.0	153.8	5.522	-5.519	0.203	43.1	63.2	116.8	07.52	-17.9	92.0
	2006-077T19:05:56.80	18-Mar-06	19:07:01	-5	-300	99,617.8	97,042.8	0.0	155.2	5.515	-5.509	0.253	51.7	63.6	116.4	07.51	-17.9	93.0
	2006-077T20:05:56.80	18-Mar-06	20:07:01	-4	-240	79,798.7	77,223.7	0.0	156.8	5.511	-5.501	0.323	64.5	64.3	115.7	07.48	-17.9	93.9
	2006-077T21:05:56.80	18-Mar-06	21:07:01	-3	-180	60,008.0	57,433.0	0.0	158.8	5.511	-5.493	0.435	85.8	65.3	114.7	07.44	-17.9	94.9
	2006-077T22:05:56.80	18-Mar-06	22:07:01	-2	-120	40,252.6	37,677.6	0.0	162.0	5.519	-5.480	0.653	128.0	67.4	112.6	07.35	-17.9	95.8
	2006-077T23:05:56.80	18-Mar-06	23:07:01	-1	-60	20,613.0	18,038.0	0.0	169.5	5.554	-5.404	1.279	250.5	73.6	106.4	07.08	-17.9	96.7
	2006-077T23:35:56.80	18-Mar-06	23:37:01	-1	-30	11,076.7	8,501.7	0.0	-178.0	5.620	-5.091	2.380	469.2	85.0	95.0	06.20	-17.9	97.2
	2006-077T23:50:56.80	18-Mar-06	23:52:01	0	-15	6,799.2	4,224.2	0.1	-159.5	5.709	-4.191	3.877	776.8	102.5	77.5	05.07	-17.9	97.4
	2006-078T00:00:56.80	19-Mar-06	00:02:01	0	-5	4,833.0	2,258.0	0.1	-130.6	5.803	-1.980	5.454	1123.8	129.4	50.6	03.12	-17.9	97.6
T12_22TI	2006-078T00:05:56.80	19-Mar-06	00:07:01	0	0	4,526.1	1,951.1	0.1	-109.4	5.824	0.000	5.824	1210.4	148.0	32.0	01.48	-17.9	97.7
	2006-078T00:10:56.80	19-Mar-06	00:12:01	0	5	4,833.0	2,258.0	0.1	-88.2	5.803	1.980	5.454	1123.8	161.3	18.7	00.23	-17.9	97.8
	2006-078T00:20:56.80	19-Mar-06	00:22:01	0	15	6,799.0	4,224.0	0.1	-59.3	5.709	4.191	3.877	776.8	151.4	28.6	22.28	-17.9	97.9
	2006-078T00:35:56.80	19-Mar-06	00:37:01	1	30	11,076.2	8,501.2	0.0	-40.8	5.619	5.090	2.380	469.3	135.8	44.2	21.15	-17.9	98.1
	2006-078T01:05:56.80	19-Mar-06	01:07:01	1	60	20,611.4	18,036.4	0.0	-28.3	5.553	5.404	1.280	250.5	124.9	55.1	20.27	-17.9	98.6
	2006-078T02:05:56.80	19-Mar-06	02:07:01	2	120	40,248.4	37,673.4	0.0	-20.8	5.518	5.479	0.657	128.0	118.7	61.3	20.01	-17.9	99.6
	2006-078T03:05:56.80	19-Mar-06	03:07:01	3	180	60,003.4	57,428.4	0.0	-17.6	5.512	5.494	0.444	85.9	116.6	63.4	19.52	-17.9	100.5
	2006-078T04:05:56.80	19-Mar-06	04:07:01	4	240	79,800.5	77,225.5	0.0	-15.5	5.515	5.505	0.338	64.5	115.5	64.5	19.47	-17.9	101.4
	2006-078T05:05:56.80	19-Mar-06	05:07:01	5	300	99,639.1	97,064.1	0.0	-13.8	5.524	5.517	0.276	51.7	114.9	65.1	19.44	-17.9	102.4
	2006-078T06:05:56.80	19-Mar-06	06:07:01	6	360	119,529.3	116,954.3	0.0	-12.4	5.539	5.533	0.237	43.1	114.4	65.6	19.42	-17.9	103.3
	2006-078T08:05:56.80	19-Mar-06	08:07:01	8	480	159,520.0	156,945.0	0.0	-9.9	5.581	5.578	0.192	32.3	113.8	66.2	19.40	-17.9	105.2
	2006-078T10:05:56.80	19-Mar-06	10:07:01	10	600	199,897.3	197,322.3	0.0	-7.6	5.644	5.641	0.170	25.8	113.4	66.6	19.38	-17.9	107.1
	2006-078T12:05:56.80	19-Mar-06	12:07:01	12	720	240,806.7	238,231.7	0.0	-5.4	5.729	5.726	0.159	21.4	113.1	66.9	19.37	-17.9	108.9
	2006-078T14:05:56.80	19-Mar-06	14:07:01	14	840	282,416.5	279,841.5	0.0	-3.3	5.838	5.837	0.152	18.2	112.9	67.1	19.36	-17.9	110.8
	2006-078T16:05:56.80	19-Mar-06	16:07:01	16	960	324,922.5	322,347.5	0.0	-1.2	5.978	5.976	0.146	15.9	112.7	67.3	19.35	-17.9	112.7
	2006-078T18:05:56.80	19-Mar-06	18:07:01	18	1080	368,552.6	365,977.6	0.0	0.8	6.151	6.150	0.136	14.0	112.5	67.5	19.34	-17.9	114.6
	2006-078T20:05:56.80	19-Mar-06	20:07:01	20	1200	413,573.8	410,998.8	0.0	2.9	6.364	6.363	0.116	12.5	112.4	67.6	19.34	-17.9	116.5
	2006-079T00:05:56.80	20-Mar-06	00:07:01	24	1440	509,096.4	506,521.4	0.0	6.8	6.941	6.941	0.023	10.1	112.3	67.7	19.33	-17.9	120.2

Cassini Titan-12 Timeline - March 2006

Colors: yellow = maneuvers; blue = geometry
pink = T12-related; green = data playbacks

Orbiter UTC	Ground UTC	Pacific Time	Time wrt T12	Activity	Description
070T00:35:00	Mar 11 01:46	Fri Mar 10 06:46 PM	T12-07d23h	Start of Sequence S19	Start of Sequence which contains Titan-12.
074T22:50:00	Mar 16 00:01	Wed Mar 15 05:01 PM	T12-03d01h	OTM #55 Prime	Titan-12 minus 3 day targeting maneuver
075T22:50:00	Mar 17 00:01	Thu Mar 16 05:01 PM	T12-02d01h	OTM #55 Backup	
077T07:49:00	Mar 18 09:00	Sat Mar 18 02:00 AM	T12-16h16m	Start of the TOST Segment	
077T08:19:00	Mar 18 09:30	Sat Mar 18 02:30 AM	T12-15h46m	Turn cameras to Titan	
077T08:19:00	Mar 18 09:30	Sat Mar 18 02:30 AM	T12-15h46m	Deadtime	Used to accommodate changes in flyby time
077T08:41:00	Mar 18 09:52	Sat Mar 18 02:52 AM	T12-15h24m	Infrared (IR) global mapping	Search for and characterize clouds.
077T10:05:00	Mar 18 11:16	Sat Mar 18 04:16 AM	T12-14h00m	IR limb stare; stratospheric studies	Obtain information on CO, HCN, CH4
077T17:05:00	Mar 18 18:16	Sat Mar 18 11:16 AM	T12-07h00m	Narrow Angle Camera (NAC) global map	Global mosaic looking for cloud activity
077T20:55:00	Mar 18 22:06	Sat Mar 18 03:06 PM	T12-03h10m	Transition to thrusters	22 min duration
077T21:16:00	Mar 18 22:27	Sat Mar 18 03:27 PM	T12-02h49m	Visible & IR Regional Map	Characterize geologic features, haze, and composition of Titan's equatorial region.
077T22:40:00	Mar 18 23:51	Sat Mar 18 04:51 PM	T12-01h25m	Radio Science (RSS) Bistatic	Determine physical properties of Titan's surface.
077T23:56:00	Mar 19 01:07	Sat Mar 18 06:07 PM	T12-00h09m	Titan Wake Crossing	
077T23:59:00	Mar 19 01:10	Sat Mar 18 06:10 PM	T12-00h06m	RSS atmospheric occultation	Understand atmospheric and ionospheric structure
078T00:05:57	Mar 19 01:16	Sat Mar 18 06:16 PM	T12+00h00m	Titan-12 Flyby Closest Approach Time	Altitude = 1951 km (1219 miles), speed = 6.0 km/s (13,400 mph); 148 deg phase at closest approach
078T01:02:57	Mar 19 02:13	Sat Mar 18 07:13 PM	T12+00h57m	Transition back to reaction wheels	21 min duration
078T01:24:00	Mar 19 02:35	Sat Mar 18 07:35 PM	T12+01h19m	RADAR scatterometry and radiometry	Surface composition and roughness measurements
078T05:35:00	Mar 19 06:46	Sat Mar 18 11:46 PM	T12+05h30m	Visible & IR observations of dark side	Cloud and aurorae search; WAC photometry
078T12:25:00	Mar 19 13:36	Sun Mar 19 06:36 AM	T12+12h20m	Far IR limb stare	Obtain information on CO, HCN, CH4
078T14:06:00	Mar 19 15:17	Sun Mar 19 08:17 AM	T12+14h01m	Deadtime	Used to accommodate changes in flyby time
078T14:22:00	Mar 19 15:33	Sun Mar 19 08:33 AM	T12+14h17m	Turn to Earth-Line	
078T14:44:00	Mar 19 15:55	Sun Mar 19 08:55 AM	T12+14h39m	Begin Playback of T12 Data	Madrid 70M
079T00:04:00	Mar 20 01:15	Sun Mar 19 06:15 PM	T12+23h59m	End Playback of T12 Data	
079T19:57:00	Mar 20 21:08	Mon Mar 20 02:08 PM	T12+01d20h	Saturn Periapsis	

OWLT (mins)	71
C/A Time	Sat Mar 18 06:16 PM

1.5 T12 DATA PLAYBACK TIMELINE

For each science observation, the table below contains a time-ordered listing of the data playback times. One-way light time at the time of the encounter is 1 hour and 11 minutes.

022TI (T12) Playback Timeline

Created Feb. 2, 2006

Event or Observation	Observation Type (APGEN)	Observation Record Start Time (yyyy- dddThh:mm:ss) (SCET)	Record Start Time Reference Epoch (ddThh:m)	Start Playback (Ground UTC)		Start Playback (Pacific Time)	
				Best Estimate	Latest Estimate	Best Estimate	Latest Estimate
CDA_022DR_2500DUST125_RIDER	CDA_524	2006-077T07:49:00	-00T16:16	19-Mar Sun 03:59 PM	Sun 03:59 PM	19-Mar Sun 07:59 AM	Sun 07:59 AM
RPWS_022SA_OUTSURVEY003_PRIME	RPWS_30464	2006-077T07:49:00	-00T16:16	19-Mar Sun 03:59 PM	Sun 03:59 PM	19-Mar Sun 07:59 AM	Sun 07:59 AM
MIMI_022CO_SURVEY013_RIDER	MIMI_8000	2006-077T07:49:01	-00T16:16	19-Mar Sun 03:59 PM	Sun 03:59 PM	19-Mar Sun 07:59 AM	Sun 07:59 AM
CAPS_022SA_SURVEY006_RIDER	CAPS_16000	2006-077T07:50:00	-00T16:15	19-Mar Sun 03:59 PM	Sun 03:59 PM	19-Mar Sun 07:59 AM	Sun 07:59 AM
MAG_022OT_SURVEY001_PRIME	MAG_1976	2006-077T07:59:00	-00T16:06	19-Mar Sun 04:00 PM	Sun 04:00 PM	19-Mar Sun 08:00 AM	Sun 08:00 AM
CIRS_022TI_FIRNADMAP004_VIMS	CIRS_4000	2006-077T08:41:57	-00T15:23	19-Mar Sun 04:02 PM	Sun 04:02 PM	19-Mar Sun 08:02 AM	Sun 08:02 AM
ISS_022TI_GLOBMAP002_VIMS	ISS_Phot_1_by_1	2006-077T08:41:57	-00T15:23	19-Mar Sun 04:02 PM	Sun 04:02 PM	19-Mar Sun 08:02 AM	Sun 08:02 AM
VIMS_022TI_GLOBMAP002_PRIME	VIMS_18432	2006-077T08:41:57	-00T15:23	19-Mar Sun 04:02 PM	Sun 04:02 PM	19-Mar Sun 08:02 AM	Sun 08:02 AM
CDA_022HY_2400HYORX020_RIDER	CDA_524	2006-077T09:06:58	-00T14:58	19-Mar Sun 04:05 PM	Sun 04:07 PM	19-Mar Sun 08:05 AM	Sun 08:07 AM
CIRS_022TI_FIRNADCMP003_PRIME	CIRS_4000	2006-077T10:05:57	-00T13:59	19-Mar Sun 04:13 PM	Sun 04:18 PM	19-Mar Sun 08:13 AM	Sun 08:18 AM
CIRS_022TI_FIRNADCMP003_SI	ISS_SUPPORT_IMAGING	2006-077T10:05:57	-00T13:59	19-Mar Sun 04:13 PM	Sun 04:18 PM	19-Mar Sun 08:13 AM	Sun 08:18 AM
ISS_022TI_FIRNADCMP003_CIRS	ISS_Phot_1_by_1	2006-077T10:05:57	-00T13:59	19-Mar Sun 04:13 PM	Sun 04:18 PM	19-Mar Sun 08:13 AM	Sun 08:18 AM
UVIS_022TI_FIRNADCMP003_CIRS	UVIS_5032	2006-077T10:05:57	-00T13:59	19-Mar Sun 04:13 PM	Sun 04:18 PM	19-Mar Sun 08:13 AM	Sun 08:18 AM
VIMS_022TI_COMPMAP003_CIRS	VIMS_18432	2006-077T10:05:57	-00T13:59	19-Mar Sun 04:13 PM	Sun 04:18 PM	19-Mar Sun 08:13 AM	Sun 08:18 AM
CDA_022DR_1700DUST121_RIDER	CDA_524	2006-077T11:07:58	-00T12:57	19-Mar Sun 04:19 PM	Sun 04:26 PM	19-Mar Sun 08:19 AM	Sun 08:26 AM
INMS_022TI_T12INBD001_RSS	INMS_1498	2006-077T12:18:58	-00T11:46	19-Mar Sun 04:26 PM	Sun 04:35 PM	19-Mar Sun 08:26 AM	Sun 08:35 AM
CIRS_022TI_FIRNADCMP002_ISS	CIRS_4000	2006-077T17:05:57	-00T06:59	19-Mar Sun 04:53 PM	Sun 05:11 PM	19-Mar Sun 08:53 AM	Sun 09:11 AM
ISS_022TI_GLOBMAPNA001_PRIME	ISS_Phot_1_by_1	2006-077T17:05:57	-00T06:59	19-Mar Sun 04:53 PM	Sun 05:11 PM	19-Mar Sun 08:53 AM	Sun 09:11 AM
UVIS_022TI_GLOBMAPNA001_ISS	UVIS_5032	2006-077T17:05:57	-00T06:59	19-Mar Sun 04:53 PM	Sun 05:11 PM	19-Mar Sun 08:53 AM	Sun 09:11 AM
VIMS_022TI_GLOBMAP003_ISS	VIMS_18432	2006-077T17:05:57	-00T06:59	19-Mar Sun 04:53 PM	Sun 05:11 PM	19-Mar Sun 08:53 AM	Sun 09:11 AM
VIMS_022TI_REGMAP003_ISS	VIMS_18432	2006-077T20:05:57	-00T03:59	19-Mar Sun 06:29 PM	Sun 06:57 PM	19-Mar Sun 10:29 AM	Sun 10:57 AM
RSS_022TI_THERMAL001_RSS	RSS_Activity	2006-077T20:45:57	-00T03:19	19-Mar Sun 06:50 PM	Sun 07:23 PM	19-Mar Sun 10:50 AM	Sun 11:23 AM
VIMS_022TI_REGMAP005_ENGR	VIMS_18432	2006-077T20:55:57	-00T03:09	19-Mar Sun 06:56 PM	Sun 07:29 PM	19-Mar Sun 10:56 AM	Sun 11:29 AM
CIRS_022TI_FIRNADCMP002_VIMS	CIRS_4000	2006-077T21:05:57	-00T02:59	19-Mar Sun 06:57 PM	Sun 07:31 PM	19-Mar Sun 10:57 AM	Sun 11:31 AM
ISS_022TI_REGMAP004_VIMS	ISS_Phot_1_by_1	2006-077T21:05:57	-00T02:59	19-Mar Sun 06:57 PM	Sun 07:31 PM	19-Mar Sun 10:57 AM	Sun 11:31 AM
UVIS_022TI_REGMAP004_VIMS	UVIS_5032	2006-077T21:16:57	-00T02:48	19-Mar Sun 06:58 PM	Sun 07:33 PM	19-Mar Sun 10:58 AM	Sun 11:33 AM
VIMS_022TI_REGMAP004_PRIME	VIMS_18432	2006-077T21:16:57	-00T02:48	19-Mar Sun 06:58 PM	Sun 07:33 PM	19-Mar Sun 10:58 AM	Sun 11:33 AM
CAPS_022TI_T12INBND001_PRIME	CAPS_16000	2006-077T22:05:57	-00T01:59	19-Mar Sun 07:04 PM	Sun 08:33 PM	19-Mar Sun 11:04 AM	Sun 12:33 PM
MAG_022TI_MAGTITAN001_PRIME	MAG_1976	2006-077T22:05:57	-00T01:59	19-Mar Sun 07:04 PM	Sun 08:33 PM	19-Mar Sun 11:04 AM	Sun 12:33 PM
MIMI_022TI_T12INBND001_CAPS	MIMI_8000	2006-077T22:05:57	-00T01:59	19-Mar Sun 07:04 PM	Sun 08:33 PM	19-Mar Sun 11:04 AM	Sun 12:33 PM
RPWS_022TI_TIINTRMED001_PRIME	RPWS_30464	2006-077T22:05:57	-00T01:59	19-Mar Sun 07:04 PM	Sun 08:33 PM	19-Mar Sun 11:04 AM	Sun 12:33 PM
RSS_022TI_BISTATIN001_PRIME	RSS_Activity	2006-077T22:40:57	-00T01:24	19-Mar Sun 07:12 PM	Sun 08:44 PM	19-Mar Sun 11:12 AM	Sun 12:44 PM
RADAR_022OT_WARM4TI12001_RIDER	RADAR_364800	2006-077T22:50:57	-00T01:14	19-Mar Sun 07:14 PM	Sun 08:45 PM	19-Mar Sun 11:14 AM	Sun 12:45 PM
CAPS_022TI_T12CLOSE001_PRIME	CAPS_16000	2006-077T23:05:57	-00T00:59	19-Mar Sun 07:16 PM	Sun 08:48 PM	19-Mar Sun 11:16 AM	Sun 12:48 PM
INMS_022TI_T12CLOSE001_RSS	INMS_1498	2006-077T23:05:57	-00T00:59	19-Mar Sun 07:16 PM	Sun 08:48 PM	19-Mar Sun 11:16 AM	Sun 12:48 PM
MIMI_022TI_T12CLOSE001_CAPS	MIMI_8000	2006-077T23:05:57	-00T00:59	19-Mar Sun 07:16 PM	Sun 08:48 PM	19-Mar Sun 11:16 AM	Sun 12:48 PM
RPWS_022TI_TICA001_PRIME	RPWS_182784	2006-077T23:35:57	-00T00:29	19-Mar Sun 07:23 PM	Sun 08:56 PM	19-Mar Sun 11:23 AM	Sun 12:56 PM
RSS_022TI_OCC001_PRIME	RSS_Activity	2006-077T23:59:57	-00T00:05	19-Mar Sun 08:27 PM	Sun 09:19 PM	19-Mar Sun 12:27 PM	Sun 01:19 PM
RPWS_022TI_TIINTRMED002_PRIME	RPWS_30464	2006-078T00:35:57	00T00:30	19-Mar Sun 08:58 PM	Sun 09:55 PM	19-Mar Sun 12:58 PM	Sun 01:55 PM
CAPS_022TI_T12OUTBND001_PRIME	CAPS_16000	2006-078T01:05:57	00T01:00	19-Mar Sun 09:05 PM	Sun 10:02 PM	19-Mar Sun 01:05 PM	Sun 02:02 PM
INMS_022TI_T12OUTBD001_RSS	INMS_1498	2006-078T01:05:57	00T01:00	19-Mar Sun 09:05 PM	Sun 10:02 PM	19-Mar Sun 01:05 PM	Sun 02:02 PM
MIMI_022TI_T12OUTBND001_CAPS	MIMI_8000	2006-078T01:05:57	00T01:00	19-Mar Sun 09:05 PM	Sun 10:02 PM	19-Mar Sun 01:05 PM	Sun 02:02 PM
RADAR_022TI_T12OUTRAD001_PRIME	RADAR_364800	2006-078T01:24:57	00T01:19	19-Mar Sun 09:08 PM	Sun 10:06 PM	19-Mar Sun 01:08 PM	Sun 02:06 PM
CAPS_022SA_SURVEY004_RIDER	CAPS_16000	2006-078T02:05:57	00T02:00	19-Mar Sun 09:19 PM	Sun 10:17 PM	19-Mar Sun 01:19 PM	Sun 02:17 PM
MAG_022OT_SURVEY009_PRIME	MAG_1976	2006-078T02:05:57	00T02:00	19-Mar Sun 09:19 PM	Sun 10:17 PM	19-Mar Sun 01:19 PM	Sun 02:17 PM
MIMI_022CO_SURVEY002_RIDER	MIMI_8000	2006-078T02:05:57	00T02:00	19-Mar Sun 09:19 PM	Sun 10:17 PM	19-Mar Sun 01:19 PM	Sun 02:17 PM
CIRS_022TI_FIRNADMAP003_VIMS	CIRS_4000	2006-078T05:35:57	00T05:30	19-Mar Sun 09:50 PM	Sun 10:49 PM	19-Mar Sun 01:50 PM	Sun 02:49 PM
ISS_022TI_AURORA002_VIMS	ISS_Phot_1_by_1	2006-078T05:35:57	00T05:30	19-Mar Sun 09:50 PM	Sun 10:49 PM	19-Mar Sun 01:50 PM	Sun 02:49 PM
UVIS_022TI_AURORA002_VIMS	UVIS_5032	2006-078T05:35:57	00T05:30	19-Mar Sun 09:50 PM	Sun 10:49 PM	19-Mar Sun 01:50 PM	Sun 02:49 PM
VIMS_022TI_AURORA002_PRIME	VIMS_18432	2006-078T05:35:57	00T05:30	19-Mar Sun 09:50 PM	Sun 10:49 PM	19-Mar Sun 01:50 PM	Sun 02:49 PM
CDA_022RI_1600RINGM023_RIDER	CDA_524	2006-078T10:49:54	00T10:43	19-Mar Sun 10:18 PM	Sun 11:26 PM	19-Mar Sun 02:18 PM	Sun 03:26 PM
INMS_022SA_SURVEY003_RIDER	INMS_1498	2006-078T12:05:57	00T12:00	19-Mar Sun 10:25 PM	Sun 11:35 PM	19-Mar Sun 02:25 PM	Sun 03:35 PM
CIRS_022TI_FIRNADCMP008_PRIME	CIRS_4000	2006-078T12:25:57	00T12:20	19-Mar Sun 10:27 PM	Sun 11:37 PM	19-Mar Sun 02:27 PM	Sun 03:37 PM
CIRS_022TI_FIRNADCMP008_SI	ISS_SUPPORT_IMAGING	2006-078T12:25:57	00T12:20	19-Mar Sun 10:27 PM	Sun 11:37 PM	19-Mar Sun 02:27 PM	Sun 03:3